



Direct Form 2, order 3

Find the state-space equations (type I)
from the direct form II implementation:

State-space equations, type I

$$\begin{cases} y[n] = \\ \begin{bmatrix} v_1[n] \\ v_2[n] \\ v_3[n] \end{bmatrix} = \end{cases}$$

g

F

$$\begin{aligned} & \begin{bmatrix} v_1[n] \\ v_2[n] \\ v_3[n] \end{bmatrix} \cdot \begin{bmatrix} v_1[n] \\ v_2[n] \\ v_3[n] \end{bmatrix} + \begin{bmatrix} d \\ d \\ d \end{bmatrix} \cdot x[n] \\ & \begin{bmatrix} v_1[n] \\ v_2[n] \\ v_3[n] \end{bmatrix} \cdot \begin{bmatrix} v_1[n] \\ v_2[n] \\ v_3[n] \end{bmatrix} + \begin{bmatrix} g \\ g \\ g \end{bmatrix} \cdot x[n] \end{aligned}$$